Optimisacion del ancho de banda (Introduction to Linux)

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Managua, Nicaragua, 27-28/8/09

UNAN-Managua

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Presentaciones

Introduction to Linux

- This is NOT:
  - A workshop on Linux/Unix system/network administration
  - A workshop on network security
  - an advanced workshop on BMO.

- This is:
  - A 2-day workshop dedicated to reviewing basic Linux/Unix concepts in order to be able to focus on BMO the next weeks (since we will work with Linux systems the all time).

Program

- Linux Distributions
- Installation process
- Documentation
- Users/Groups
- Filesystem/s
- Package management
- Kernel and Modules
- Log files
- *Automating tasks*
- *System services*
- *Run levels*
- *DNS Basics and config*
- *Basic host net cfg*
-

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Linux Distributions

(See http://en.wikipedia.org/wiki/Linux_distribution)

Linux Distributions

- Graphical interface/s
- Easiness of use
- Kernel version (vanilla + enhancements)
- Application types (security, Virtual Machines, ...)
- Standard and/or Live
- Free and/or Commercial

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Installation process

- Media Source (CD, DVD, ISO image, NET)
- Disk Partitioning
- Window Manager/s and Applications
- User/App/System Configuration

Installation process
(partitioning)

- Automatic vs Manual partitioning
- Factors to take into account:
  - Dual / multiboot system
  - HD / RAM upgrade
  - OS vs DATA
  - Encryption
  - Volumes / RAID
- Special directories / partitions:
  - */boot*
  - [SWAP]
  - */var/log*
  - */home*
  - ...

Installation process
(Window Manager/s and Applications)

KDE
(http://www.kde.org)

GNOME
(http://www.gnome.org)

ENLIGHTMENT
http://www.enlightenment.org

....

(Do not confuse the Windows managers
with the Window manager's themes)

Fedora Core 10 Installation

- Please use the following configuration:
  - Root password: **una123**
  - User name/password: **una/una**
  - Hostname: **PCXY** where X/Y are Row/Column
  - Partitions ...

Programe

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Documentation

- Command line documentation: *man/info* commands
- Basic kernel doc in directory
  - *<kernel_source>/DOCUMENTATION*
- Homepage of the Linux distribution
  - For example, Fedora doc available here: *http://docs.fedoraproject.org/*
- The Linux Documentation Project:
  - http://tldp.org
- Free online books (made legally available by the authors / publishers)
- and .... Google

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Users / Groups

- Creating/Deleting/Administering users
  - How would you guess what the commands to add/del users/groups could be?
- Login Passwords
  - How would you guess what the commands to change user login passwords could be?
- File permissions/ownerships
  - “suid” commands

User / Groups

- *useradd*
- *userdel*
- *usermod*
- *userpasswd* (graphical interface)
- *users* (use “w” instead)

Use the *man* command to get a description and the usage syntax.

Key files in */etc*

- /etc/passwd
- /etc/shadow

- /etc/groups
- /etc/gshadow (we won't look at this)

Syntax of */etc/passwd* lines

Username	X (pass)	User ID	(Primary) GroupID	Comment	Home Dir	Shell

Examples:

root:	x:	0:	0:	root:	/root:	/bin/bash
benve:	x:	500:	500:	CB:	/home/benve:	/bin/bash
apache:	x:	48:	48:	Apache:	/var/www:	/sbin/nologin

Syntax of */etc/shadow* lines

Username	Encrypted password	Last paswd change	Minimum	Maximum	Warning	Inactive	Expire

Examples:

root:	6x...:	14211:	0:	99999:	7:	:	:
benve:	6h...:	14212:	0:	99999:	7:	:	:
apache:	!!:	14211:	0:	99999:	7:	:	:

Syntax of */etc/group* lines

Group name	X (pass)	Group ID	Group members

Examples:

root:x:0:root
benve:x:500:
apache:x:48:

Exercise 1

- Using the command line:
  - create the two new users ***user_test1*** and ***user_test2***
  - delete the user ***user_test2***
- Verify the configuration (how??? su)

Exercise 2

- Using the command line:
  - create the two new groups ***grp_test1*** and ***grp_test2***
  - add user ***user_test1*** to group ***gpr_test1***
  - Change user ***user_test1***'s password to *1234abcd*
- Verify the configuration (how???)

Exercise 3

- What is the Fedora GUI for managing users/groups?
- Using the Fedora GUI:
  - create the new user ***user_test3***
  - add user ***user_test3*** to group ***grp_test2***
  - Create the new group ***grp_test3***
  - Add user ***user_test3*** to group ***grp_test3*** too
  - Change user ***user_test3***'s password to *abcd1234*
- Verify the configuration (how???)

File ownerships

- Each file/directory has:
  - Owner user
  - Owner group
- Changing ownerships
  - Command ***chgrp***
  - Command ***chown***

Exercise 4

- Log in as user ***una***.
- Create an empty file ***test_file.txt*** in your home directory
- Check its user/group owners
- Change them (using chmod) to ***root***/***root***
- Change them (using chmod) to ***user_test3***/***grp_test1***

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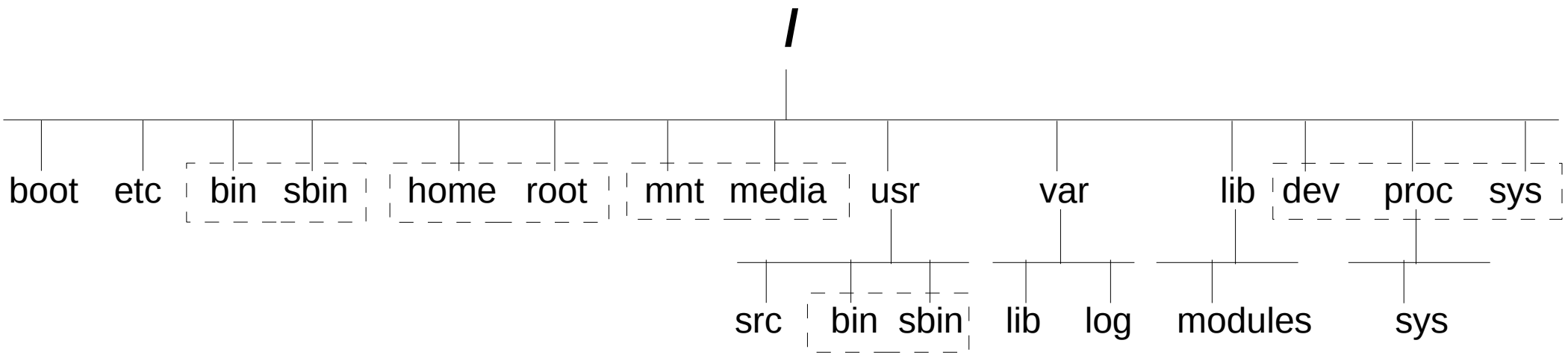
Filesystems

- Default filesystem tree
- Filesystem types
  - Special/Virtual filesystems
- Creating filesystems

Default filesystem tree



(I have omitted a few directories for simplicity)

Filesystem types

- VFAT / NTFS (Windows compatibility)
- ext2 / **ext3** / ext4
- SWAP
- ...

- Differences
  - Native OS
  - Simple or with support for Journaling
  - Local or network(let's ignore this type for now)

Virtual Filesystems

- /proc
- **/proc/sys**
- /sys
- /dev
- ...

Creating Filesystems

- /sbin/
  - mkfs
  - mkfs.vfat
  - mkfs.ntfs
  - mkfs.ext2
  - mkfs.ext3
  - mkfs.ext4
  - mkswap
  - ...

Example - Create an ext3 filesystem on the (already existent) partition /dev/sda5: ***mkfs.ext3 /dev/sda5***

Creating Filesystems

- You do not create a filesystem on a directory
- You create it on:
  - a partition, or
  - an entire HD, or
  - a Volume, or
  - a file (that you will mount with the *loop* option)
  - ... etc

Checking the integrity of a filesystem

- /sbin/
  - fsck
  - fsck.vfat
  - fsck.ntfs
  - fsck.ext2
  - fsck.ext3
  - fsck.ext4
  - ...

Example – Check the integrity of the ext3 filesystem on the (already existent) partition /dev/sda5: ***fsck.ext3 /dev/sda5***

Mounting a Filesystem (*mount* command)

- Simplified syntax (see *man* for the complete syntax)
  - *mount [-t vfstype] [-o options] device dir*

- Examples
  - mount -t ext3 /dev/hda2 /home
  - mount -t vfat /dev/hda3 /DATA_WIN

Exercise 5

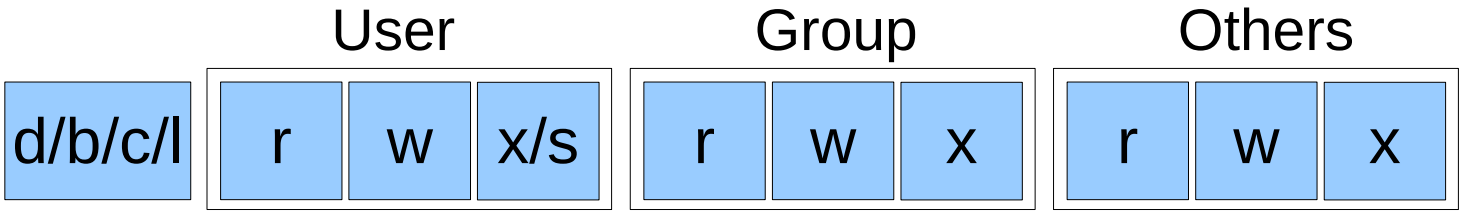
- Use the ***mount*** command to see what/where filesystems your system has mounted (do not get scared!)
- See what additional information the command ***df*** provides

Exercise 6

- Create a new partition of 1GB
  - If you do not know how to use the *fdisk* command, PLEASE ask!
- Create an ext3 filesystem on it
- Mount the new partition under ***/mnt/TEST*** (*)

- The mount command does not make changes permanent. How would you make the config (*) permanent?

Permissions



Examples

/bin/ls	-	rwx	r-x	r-x	root root	
/etc	d	rwx	r-x	r-x	root root	
/usr/bin/passwd	-	rw**s**	r-x	r-x	root root	
/dev/sda1	b	rw-	rw-	---	root disk	
/dev/tty0	c	rw-	-w-	---	root root	
/sbin/mkfs.msdos	l	rwx	rwx	rwx	root root	mkfs.msdos -> mkdosfs

Changing Permissions
(*chmod* command)

- You can add/remove/set permissions
- Simplified syntax (see *man* for the complete syntax)
  - *chmod [-R] [ugoa] [-+=] file/directory_name*

- Examples
  - *chmod ugo=rx test.txt*
  - *chmod go-w doc.txt*
  - *chmod go+r foto.jpg*
  - *chmod -R ugo+rwx /shared_dir/*

Exercise 7

- Login as user *una*
- Create a text file named **arbol.txt**
- Check its default permissions
- Would it make sense to add the X permission for the owner (ie user *una*)?
- And for the other users?
- Remove the R permission for “Others”.
  - Verify it
- Remove the W permission for the people in the same group as user *una*.
  - Verify it

Exercise 8

- Log in as user *una*
- Create the text file **lssl**
- Check its permissions
- What result do you get if you type these commands?
  - ***ls*** <TAB> <TAB>
  - ./***ls*** <TAB> <TAB>
- Add the X permission to **lssl** for the user *una*
- Now what results do you get if you type the above two commands?

Links
(*ln* command)

- Hard VS Symbolic
  - Hard links cannot cross file system boundaries
- Simplified syntax (see *man* for the complete syntax)
  - *ln [-s] TARGET LINK_NAME*

- Examples
  - *ln /data/foto/sol.jpg foto_sol.jpg*
  - *ln -s /FOTOS/sol.jpg /home/una/Desktop/foto_sol.jpg*

Exercise 9

- Login as *root*
- In the *root*'s home directory create a hard link to **/bin/ls** named **mio_ls**
- Login as user *una*
- In the *una*'s home directory create a hard link to **/bin/ls** named **mio_ls**
- In the *una*'s home directory create a symbolic link to **/bin/ls** named **mio_ls**

Searching the Filesystem

- *find* vs *locate*

- *Examples*
  - *find /etc -name httpd**
  - *find /proc/sys -name ip_forward*
  - *locate httpd.conf*
  - *locate sch_htb*

Exercise 10

- Using the *man* command, find the syntax of the commands *find* and *locate*
- Now using the above commands determine:
  - The location of the file xinetd.conf
  - The location of the file ip_forward.c
- Answer the following questions (you can use the *man* command to get some help):
  - Which one between the two is faster?
  - Which one between the two is more reliable?

Exercise 11

- Login as user *una*
- Create the file **abcd_1234** in the directory */tmp*
- Supposing you did not know where such file was, search it using *find* and *locate*. What results did you get?
- Now run the command *updatedb*
- Do *find* and *locate* return the same results now?

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Package Management

- Distribution specific
  - Different distributions provide different mechanisms for
    - Installing applications
    - Downloading updates
    - Etc
- Tarball/CompressedTarball (.tar, .tar.gz, .tar.bz2, ...)
  - Can be used with any Linux distribution, but ...

Package Management

- Since we are using **Fedora Core 10** in the lab, we will look at:
  - *rpm*
  - *yum* / *yumex*
  - (You can also use the apt/synaptic interface of Debian if like, but we won't look at this today. See package “apt”)
- ... but also at tarball archives.

Package Management **(rpm)**

- Install a package (without taking care of dependencies)
  - *rpm **-i** <package_name>*
- Check whether a package is installed
  - *rpm **-qi** <package_name>*
- Get the list of files in a given package
  - *rpm **-ql** <package_name>*
- Get the package a given file belongs to.
  - *rpm **-qf** <file_name>*
- ...

Exercise 12

- Check whether the package **iptables** is installed on the system
  - If it is installed, what version is it? When was it released?
- Determine, using the *rpm* command, what files belong to this package.

Exercise 13

- Check whether the package **yumex** is installed on the system
- Download the package **yumex** (or get it from the Fedora Core 10 DVD you have used for the installation)
- Install it with the *rpm* command
- Determine, using the *rpm* command, what its configuration files are.

Exercise 14

- Determine what package the file **passwd** belongs too.
- Determine what package the file ***/etc/resolv.conf*** belongs too.
- Determine what configuration files are used by the **httpd** web server.

Basic packages management **(yum)**

- Install a package (taking care of dependencies)
  - *yum **install** <package_name>*
- Check dependencies for a package
  - *yum **deplist** <package_name>*
    - (ex *yum deplist cacti*)
- Search for packages matching a given string
  - *yum **search** <string>*
- ...

Exercise 15

- Check whether the package **yumex** is already installed on the system
- Install it with the *yum* command if necessary
- Use **yumex** to install one package from the group *Applications*

Package Management (**Repositories)**

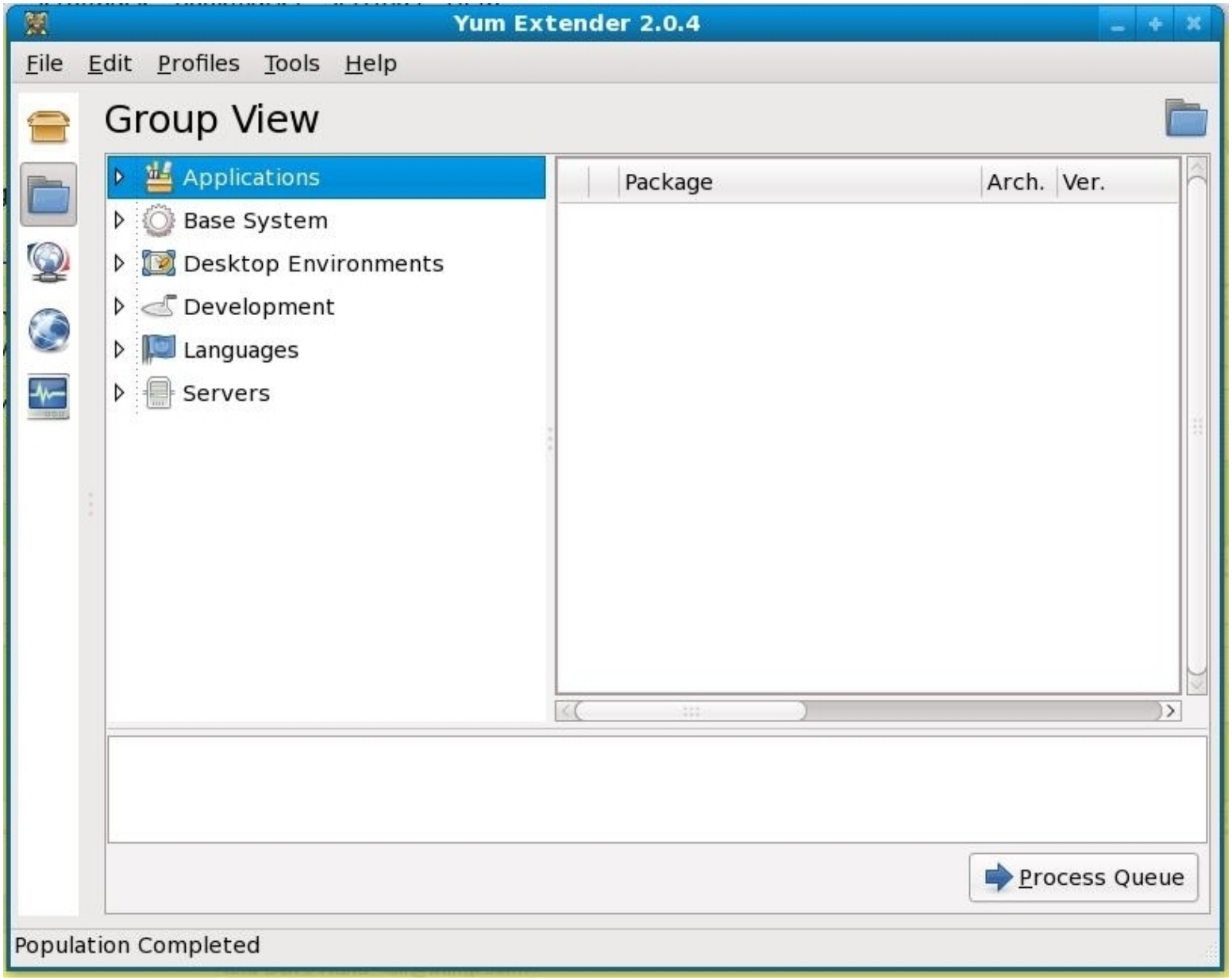
- The tools (like **yum**) that use the network to download applications/updates, connect to servers referred to as repositories.
- Depending on how you installed your system, by default your Fedora Core 10 system may be using only a couple of default repositories, but you can add others.

Exercise 16

- Using the *man* command, determine the *yum* option that tells you what repositories *yum* is configure to use.
- Using the *rpm* command, determine what the configuration files of *yum* are, and find the piece of configuration that tells *yum* to use the repositories returned by the previous command.
- OPTIONAL EXERCISE:
  - Add new repositories

    (for example http://rpm.livna.org/)

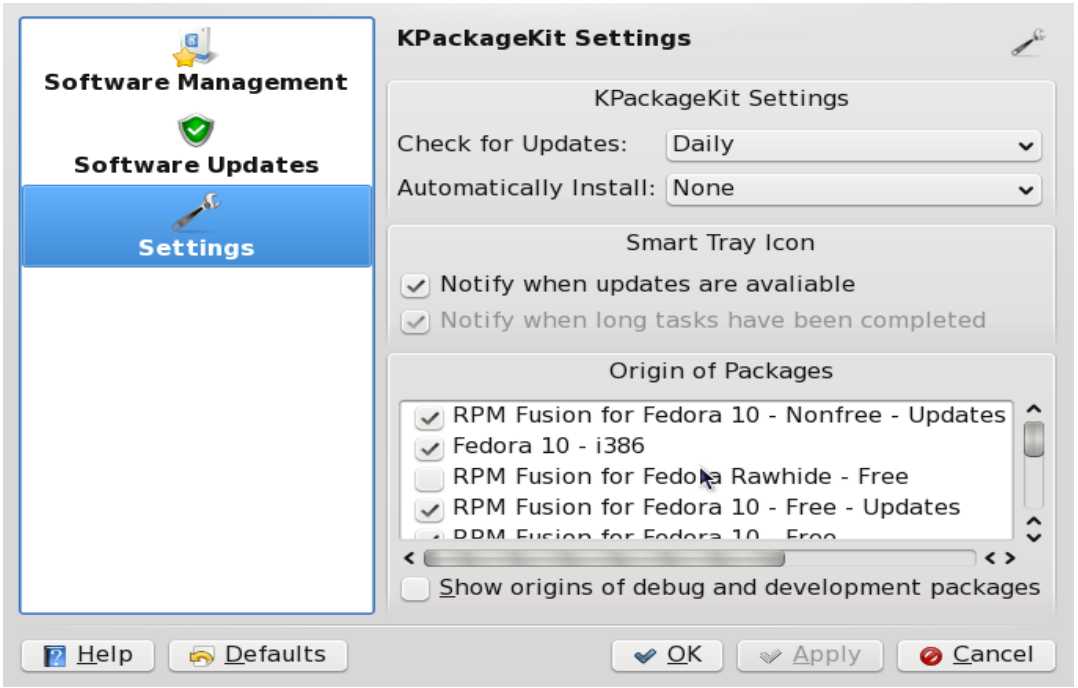
Package management
(YumEx - ie, Yum Extender)



yum install yumex

Package Management (PackageKit)

- Another GUI for managing packages
- See http://www.proyectofedora.org/wiki/index.php/PackageKit
- It is ON by default on Fedora Core 10.
  - EXERCISE: try to disable it.



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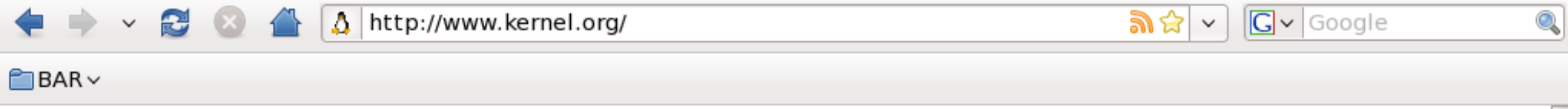
Kernel

- How/Where to download it
- Versioning scheme
- Source Code
- Configuration
- Compilation
- Installation
- Managing modules

Downloading
(http://www.kernel.org)



The Linux Kernel Archives

Welcome to the Linux Kernel Archives. This is the primary site for the Linux kernel source, but it has much more than just Linux kernels. Frequently Asked Questions

Protocol	Location
HTTP	http://www.kernel.org/pub/
FTP	ftp://ftp.kernel.org/pub/
RSYNC	rsync://rsync.kernel.org/pub/

The latest stable version of the Linux kernel is:	**2.6.29.2**	2009-04-27 17:39 UTC	F	V	VI	C	Changelog
The latest prepatch for the stable Linux kernel tree is:	**2.6.30-rc4**	2009-04-30 05:13 UTC	B	V	VI	C	Changelog
The latest snapshot for the stable Linux kernel tree is:	**2.6.30-rc4-git1**	2009-05-03 00:01 UTC	B	V		C	
The latest 2.4 version of the Linux kernel is:	**2.4.37.1**	2009-04-19 18:45 UTC	F	V		C	Changelog
The latest 2.2 version of the Linux kernel is:	**2.2.26**	2004-02-25 00:28 UTC	F	V			Changelog
The latest prepatch for the 2.2 Linux kernel tree is:	**2.2.27-rc2**	2005-01-12 23:55 UTC	B	V	VI		Changelog
The latest -mm patch to the stable Linux kernels is:	**2.6.28-rc2-mm1**	2008-10-29 06:29 UTC		V			

F = full source, **B** = patch baseline, **V** = view patch, **VI** = view incremental, **C** = current changesets
Changelogs are provided by the kernel authors directly. Please don't write the webmaster about them.
Customize the patch viewer

Installation

How many of you are (or used to be) **programmers**?

Installation

- Decompress it under */usr/src*
- Configure it with one of the following commands (there are many more):
  - ***make xconfig***
  - *make menuconfig*
- Compile the image
  - ***make***
- Compile the modules
  - ***make modules***
- *Install the modules*
  - ***make modules_install***
- Install the kernel image (ie, update bootloader)
  - ***make install***

Kernel
(Modules)

- The package used to administer modules is *module-init-tools* (use the *rpm* command to determine what its config files are)
- The modules for the X.Y.Z.K kernel version are located at:
  - /lib/modules/X.Y.Z.K/
- Useful commands:
  - lsmod
  - insmod
  - modprobe

Exercize: cuales son los modules del Kernel en RAM que estan usados por el firewall?

Kernel
(Documentation)

- *Directory /Documentation*
- BOOK: *Linux kernel in a Nutshell*, Oreilly, by Greg Kroah-Hartman
  - This book is also freely downloadable in PDF format here: *http://www.kroah.com/lkn/*

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Automating tasks

- cronie
  - “system” service cron
- anacron
- crontabs

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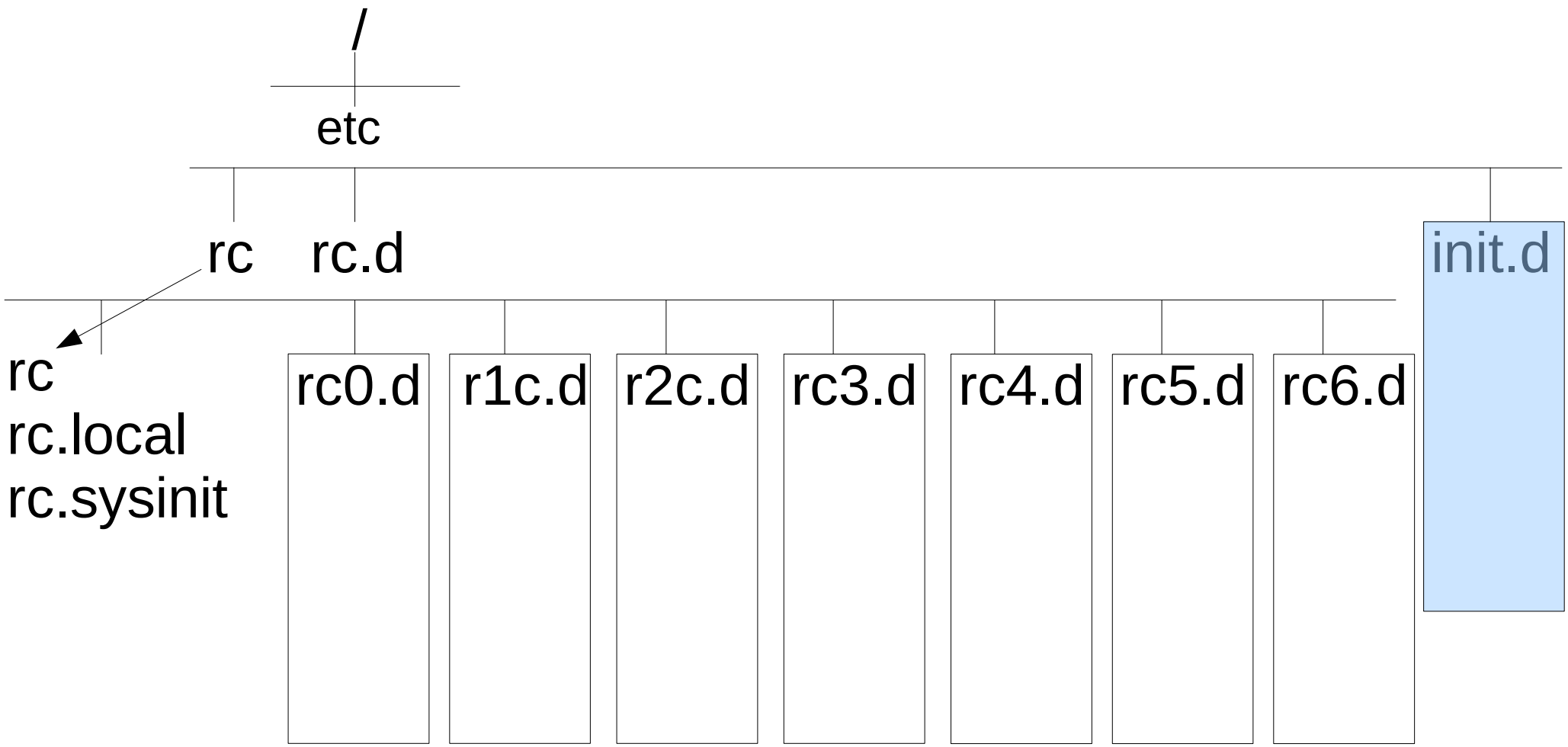
System Services & Run Levels

- Run Levels: 0 1 2 3 4 5 6



- S*service_name* vs K*service_name*

System Services & Run Levels

- init
- chkconfig
- System --> Administracion --> Services

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DNS Basic

- We will look at the theory when reviewing the networking basics.
- The DHCP server usually provides the info necessary to configure the local */etc/resolv.conf* file.
- Host Config files:
  - */etc/host.conf*
  - */etc/hosts*
  - */etc/resolv.conf*

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Basic host net cfg

- Config files and scripts
  - ifup/ifdown ....
  - /etc/sysconfig/
  - + /etc/resolv.conf /etc/hosts ...
- *system-config-network*
  - MENU: System / Administration / Network
- NetworkManager
  - How to enable/disable it?

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